4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

The surface estate of the WMA is almost entirely privately-owned. Coteau holds coal leases for the non-federal coal and is expected to recover all non-federal coal reserves. Adding federal reserves to the WMA mix would not constitute a substantial alteration to the overall mine plan because unleased federal coal accounts for a modest fraction of total reserves.

4.2 ANALYSIS ASSUMPTIONS

The surface mining operation is a major undertaking. Equipment used includes a dragline, overburden trucks and shovels, bulldozers and bottom-dump coal haulers, front-end coal loaders and a variety of trucks (water, dump, supply, fuel, welding, field maintenance). One can also see coal drills, cable movers, sheepsfoot compactors, road graders, mobile cranes, portable air compressors, water pumps, and scrapers on the mine site at any given time.

Coteau employs about 400 persons working eight-hour, 10-hour, or 12-hour shifts from five to seven days per week, depending on conditions and the season of year. It is estimated that as much as a quarter section (160 acres) of coal lands could be disturbed by direct impacts (overburden removal and coal extraction) during an average year in the WMA. Because reclamation is concurrent with mining, an additional 200 acres is unavailable for crops or grazing at any given time.

4.3 AIR QUALITY

Coal mining and processing at the Freedom Mine are sources of particulate and gaseous air pollutants. Fugitive dust is generated by mining, hauling, processing, and storing coal and is mitigated by dust suppression practices. Gaseous pollutant emissions are generated by engine exhaust from mining equipment.

Regulation of industrial air quality falls under the auspices of the North Dakota Department of Health, Environmental Health Section. Compliance with the terms and conditions of an air quality permit ensures fulfillment of applicable state and National Ambient Air Quality Standards (NAAQS).

Alternative A (Proposed Action)

Coteau operates the Freedom Mine under authority granted by North Dakota Air Pollution Control Minor Source Permit to Operate # 085004. The WMA was included in the original permit application and is covered by Coteau's existing permit.

Through the air-quality permit, North Dakota Department of Health sets standards that ensure the project meets requirements of state and federal air-quality regulations. Under Alternative A, development of the WMA would maintain coal production as allowed under Coteau's air quality permit. Maximum annual coal production is limited to 16.5 million tons.

Alternative B (No Action)

Impacts to air resources would be similar to those described above. Freedom Mine would be expanded to include state and private coal; federal reserves would be bypassed during mining. A maximum of 16.5 million tons of coal would be processed at the mine each year.

Alternative C (Preferred)

Impacts under this alternative would be identical to Alternative A. Federal, state, and private coal reserves would be mined and processed. Control of particulate emissions, as required by Coteau's air-quality permit, represents standard industry practice for minimizing particulate emissions.

In summary, mining operations would comply with state ambient air-quality and Class II annual standards under any of the alternatives. No residual or cumulative impacts to air quality or climate (from particulate or gaseous emissions) would occur from a continuation of the present level of operations at the Freedom Mine.

Sulfur Dioxide Exceedences

The U.S. Environmental Protection Agency (EPA) submitted comments on sulfur dioxide emissions from coal-fired power plants using lignite coal from the Freedom Mine as follows:

> [S]ulfur dioxide air emissions in the area of this mine have exceeded the level of significant deterioration (PSD increment) in several areas valued for high-quality, clean air such as National Parks. For this project, areas affected by sulfur dioxide emissions include the Theodore Roosevelt National Park, the Lostwood Wilderness Area, the Medicine Lakes Wilderness Area in Montana and the Fort Peck Indian Reservation.

Sulfur dioxide results from burning coal, an activity indirectly associated with leasing and mining of federal coal. The BLM does not permit nor monitor burning of coal for purposes of generating electricity. Freedom Mine's end use facilities are all operational and licensed by the proper authority.

The North Dakota Department of Health, which is responsible for air-quality monitoring in North Dakota, is negotiating with the EPA concerning sulfur dioxide exceedences in Class I areas. Resolving differences in the measurement and enforcement of air quality standards between state and federal regulators is beyond the scope of this EIS.

4.4 WATER RESOURCES

Groundwater

Surface coal mining impacts groundwater quantity in two ways: (1) aquifers are removed and replaced with unconsolidated backfill and (2) groundwater levels in aquifers adjacent to the mines are lowered as a result of seepage and dewatering into the open pit. If federal tracts are leased, the area of coal removal and reclamation at Freedom Mine would increase slightly, and impacts to groundwater would increase. The area subject to lower water levels would grow roughly in proportion to the area being mined.

Mining of each federal tract would replace shallow aquifers with backfill composed of an unlayered mixture of the clay, silt, and sand that makes up the Sentinel Butte Formation. Impacts to the local groundwater system would include dewatering the coal and overburden within the area of coal removal and enlarging the area of drawdown caused by coal and overburden removal. The extent that a drawdown propagates away from a mine pit is a function of the water-bearing properties of the aquifer. The low permeability of lignite aquifers suggests that measurable declines in groundwater levels would not extend more than one to two miles from an active mine site (Crawley and Emerson 1981).

Disturbances from mining may result in altered chemical quality of shallow groundwater aquifers. Increases in sodium, sulfates, and total dissolved solid concentrations have been reported by Groenwald (1980) and Groenwald and Rehm (1979) at other mines in North Dakota with similar overburden. Degradation of water quality at the mine site is likely. Water quality in replaced overburden would be similarly degraded.

Surface mining would not adversely impact water levels and water quality in deep aquifers. Replacement water from deeper aquifers would be available if shallow wells were adversely affected.

Up to one dozen private water wells could be impacted (either directly by removal of the well or indirectly by water-level drawdown) by mining operations occurring within the WMA. In compliance with state law, mine operators are required to provide the owner of a water right (one whose water source is interrupted, discontinued or diminished by mining) with water of equivalent quantity and quality; this mitigation measure would be included under any mining approval. The most probable source of replacement water would be from an aquifer beneath the Beulah-Zap coal seam. Subcoal aquifers are not removed or disturbed by coal mining and so are not impacted by surface mining activity.

Surface Water

Alteration of existing drainage patterns would occur during mining and reclamation. Because of erosion and sediment control measures (including sediment-control ponds) used during and after reclamation, increases in sediment load to Spring Creek, Antelope Creek, and Lake Sakakawea are expected to be minimal. Erosion could occur during periods of measurable rainfall and snowmelt runoff. Once vegetation growth and density on reclaimed areas becomes sufficiently reestablished, many of the erosion and sediment controls would no longer be necessary. Sediment control is subject to limitations of a National Pollution Discharge Elimination System Permit.

Alternative A (Proposed Action)

Direct and indirect impacts to water resources would occur as a result of coal mining and related activities. Excavation of an open pit would temporarily disrupt local surface water drainage systems. Impacts to groundwater would also occur because mining would remove portions of several sedimentary layers in the WMA.

Alternative B (No Action)

Because mining of non-federal coal would disturb much of the WMA, the impacts under this alternative are similar to those of Alternative A.

Alternative C (Preferred)

Impacts to water resources under Alternative C would be as described for the Alternative A.

The post mining backfill may take in excess of 100 years to reach equilibrium water levels and water quality. Less time would be required near the mining boundaries. Water level and water quality in the backfill would possibly be suitable to provide water to wells for livestock use, but would differ from pre-mining conditions.

Replaced wetlands may not duplicate the exact function and landscape features of all pre-mining wetlands. They are likely to have more open water than pre-mining drainage wetlands and more opportunities for vegetation zone development. This would be expected to provide more habitat for waterfowl. All wetland replacement plans would require approval by the PSC.

4.5 SOILS

Alternative A (Proposed Action)

A short-term loss of soil productivity would occur during mining; productivity would be restored with proper reclamation and management. Topsoil and subsoil removed during early stages of mining would provide an adequate layer of productive material to be replaced and averaged on reshaped overburden during reclamation. The PSC's "Rules Governing Reclamation of Surface-Mined Land" (2001) require all soils within mine permit areas to be intensively surveyed, with depths of topsoil and subsoil layers to be saved, identified and marked prior to lifting. Soil material would either be stockpiled for later redistribution or hauled directly to reshaped overburden that is ready for soil replacement.

Soil instability and erosional problems associated with reclamation would be kept to a minimum with proper handling techniques and adherence to regulatory guidelines as promulgated in the above-reference PSC rules. All runoff from disturbed areas would be required to pass through sedimentation ponds on the mine permit areas, thus trapping water-eroded soil materials before they move offsite. Vegetative cover would be restored on re-spread soils as quickly as possible to stabilize sites and reduce erosion. Reclaimed lands would remain under bond with the PSC until such time that successful reclamation is demonstrated under its standards.

Disturbance of any identified prime farmland would require operations in accordance with performance standards stipulated in the PSC rules.

Alternative B (No Action)

Impacts to soils would be the same as those described for Alternative A, but the 5,571 acres of federal coal would not be leased under this alternative. Even though the federal coal would not be leased, much of the private surface above it could be disturbed by pit-wall layback, haul roads, soil stockpiles, sedimentation ponds and the like. About 5,000 of the 5,571 acres over federal coal could potentially receive surface disturbing activities under this alternative.

Alternative C (Preferred)

Impacts to soils would be as described under Alternative A. The soils as they once existed would disappear with removal prior to mining. The new soil returned during reclamation would be a mixture of the soil originally removed and would develop its own characteristics. Productivity of this new soil would return with good management during reclamation

4.6 LAND USE/VEGETATION

Alternative A (Proposed Action)

Mining would modify topography of the area. Changes in the surface configuration are expected after reclamation as the landscape is restored to its approximate original contour. Steeper slopes may be reclaimed at lower gradients to improve water infiltration and lessen the impacts of erosion.

More land may eventually be converted to cropland after reclamation depending upon surface-owner preferences. Vegetation would be removed in areas being mined, but would be reestablished during reclamation. Some invasive, non-native noxious weeds would be expected to take root during reclamation. The lessee would be required to control such weeds as part of a reclamation program, which would be overseen by the PSC.

Alternative B (No Action)

Impacts would be the same as under the Proposed Action except slightly less surface land and vegetation would be disturbed (see discussion for Alternative B under Part 4.5 Soils).

Alternative C (Preferred)

Impacts would be the same as under the Alternative A. Residual impacts to land use are expected to be minimal because crop, rangelands, wetlands and other wildlife habitats would be replaced. Reclaimed prairie communities may never completely match the surrounding native plant community.

Wetlands, including fen-like wetlands, would be removed during mining. Appropriate water permits (i.e., Corps of Engineers Water Permit) would be required as part of the mine permit process. All wetland replacement plans submitted by the mining company would require approval by the PSC.

4.7 WILDLIFE

Alternative A (Proposed Action)

Wildlife habitat in the WMA has already been greatly reduced by modification of the land from native prairie to cropland. Remaining areas of native prairie are used to graze livestock or are harvested for hay. These habitats would be disturbed incrementally as mining progresses across the landscape. Wildlife, including migratory birds, would be disturbed or displaced where active mining occurs but, in turn, would find new habitat in reclaimed lands or adjacent/nearby undisturbed areas. Restrictions to wildlife movement created by fences, spoil piles, and pits would also occur. Some wildlife mortality would be expected due to mining. Animals such as rodents, skunks, snakes, and frogs would likely be the most vulnerable to injury or death by surface operations. However, this would be offset by additional habitat created by sedimentation ponds and dense grass cover plantings developed during mining and reclamation operations.

Wetland, native prairie, wood/shrub habitat would be removed by mining. These habitats would be replaced as part of the reclamation process.

Alternative B (No Action)

Impacts to wildlife would be very much the same as under Alternative A. Federal coal would not be mined under this alternative, but the recovery of state and private coal and disturbances to private surface over federal coal would result in similar impacts to wildlife.

Alternative C (Preferred)

Impacts to wildlife under this alternative would be as described under Alternative A. Residual impacts to wildlife would be minimal. Habitat restored as part of a well-developed reclamation plan could be as good as what existed prior to mining because of the alternations to the landscape that occurred due to farming and ranching over the past century.

No residual impacts to T&E or candidate plant or animal species are expected. The BLM's North Dakota Field Office consulted with the FWS regarding T&E species. FWS responded by memo, dated March 29, 2002, that it was not aware of any T&E species listed for Mercer County frequenting the WMA. The FWS concluded that it does not object to leasing the federal coal tracts, consistent with BLM's 1988 RMP. On July 30, 2003, the BLM requested an update from FWS on T&E consultation because over a year had passed since the initial correspondence. The BLM North Dakota Field Office received a reply from FWS on August 22, 2003, confirming its earlier conclusion. There were no FWS candidate (Dakota skipper butterfly) or sensitive (western burrowing owl, Baird's sparrow) species observed during wildlife surveys conducted within the past three and one-half years in the WMA.

4.8 CULTURAL RESOURCES

To members of Indian communities with historical ties to the project area, stones and stone features are often as important today as they were in the past. As these stone features are destroyed and remaining features isolated on private tracts, it becomes more difficult for Indian people to gain access to stone-feature sites for traditional purposes. Traditional cultural uses include conducting cultural ceremonies and the collection of culturally important plants located adjacent to the sites. Some of these plants are important as food items and symbols of tribal identity; others may have ceremonial and medicinal uses.

While there may be a tendency to suggest that large and small rings should be considered "more important" because their functions may have been other than tipi rings (see Stone Rings in Archeological Features, Appendix D), consulted American Indians have not rated various stone features differently. Therefore, in this analysis, all stone features are ascribed an equal value. The numbers that are adversely affected, avoided, or preserved, and the acres of cultural landscape surrounding them are enumerated (Tables 4.2 and 4.3). Access to preserved sites is also addressed.

A Programmatic Agreement and Management Plan for cultural resources was developed in compliance with the National Historic Preservation Act and North Dakota Century Code, in concert with the requirements of SMCRA as set forth in the North Dakota coal program. The accepted Management Plan was used for analysis of the alternatives and is the basis for Alternative C. This Alternative varies slightly from that in the DEIS as the Management Plan was modified after the issuance of the DEIS because certain lands to be preserved could not be acquired by Coteau.

Under Alternative A, Historic Properties would be avoided or mitigated by traditional archeological investigation; there would be no active preservation of the sites. Under Alternative B, BLM would withdraw from further cultural resource considerations. Historic Properties, however, would be avoided or mitigated by archeological investigations as in the Proposed Action under the North Dakota Century Code in concert with the requirements of SMCRA. Under Alternative B (No Action) it would be up to Coteau, the PSC, and the Director of the State Historical Society to determine if there would be any active preservation of the sites. Alternative C would provide for an active component of preservation of cultural resources for sites within the WMA, donation of monies to the Indian Cultural Education Trust,

and access to the preserved sites for all Indian peoples as directed by the Programmatic Agreement and Management Plan.

A distinction between avoidance and preservation is critical to this analysis. Under the Programmatic Agreement and Management Plan, designated lands within and adjacent to the WMA would be donated to North Dakota's Indian Cultural Education Trust, preserved for future generations and would provide access to stone features for tribal peoples. If sites are only avoided, while potentially protected from coal mining, they would remain in private ownership and could be destroyed by subsequent development.

The Indian Cultural Education Trust (North Dakota Century Code Chapter 15-68) was conceived by Coteau and enacted by the North Dakota Legislature in 2003. The purpose of the Trust, managed by the North Dakota State Land Department, is to generate income through grazing leases for educational activities of American Indians. Lands would be conveyed into the Trust under the terms and conditions of donor agreements. Donor agreements make provisions for specific site protection measures to be implemented by the tribes and required by state law. Any restrictions on public access or land use activities, the manner in which net income from the Trust would be disbursed to the tribe(s), which tribal representatives are to be contacted with regard to Trust matters, along with any other provisions deemed necessary by the parties to the donor agreement or the State Land Department, are contained in the agreement.

Long-term site protection is afforded for specific sites through Coteau's acquisition of lands and donation to the Trust for perpetual preservation. Funds accumulated in the Trust could allow American Indians to carry on an understanding of traditional cultures to their own people—knowledge that might otherwise be lost across the generations. In this way the future would serve as a link to the past. American Indian access would be provided to preserved sites, allowing them visitation rights to conduct ceremonies and other activities as they see fit. Also, through coordination with tribal representatives, a seed mixture containing traditional plant life would be sown on disturbed lands placed in the Trust. The plants would be available for collection and ceremonial use by American Indians, thereby enhancing the traditional connection to life on the Plains.

Under the Alternatives A and B, sites that are avoided would remain in private ownership. It would be at the landowner's discretion whether sites would be preserved and the lands remain in native pasture. Under Alternative C, these sites, along with additional sites outside the WMA, would be placed in a trust for the protection of cultural resources and the landscape, and to provide access to tribal peoples.

Alternative A (Proposed Action)

The Proposed Action is to lease 5,571 acres of federal coal beneath private surface. Leasing presupposes that the coal would be mined, resulting in direct effects to cultural resources. Under this action, physical disturbance of the only recorded, unmarked burial would be stipulated for no surface disturbance (two additional burials discovered after the issuance of the DEIS would be moved under this alternative). To meet obligations under the NHPA, 14 Historic Properties located over federal coal would be avoided or mitigated for their potential to yield scientific contributions to prehistory through planned archeological investigations in conjunction with 26 other prehistoric Historic Properties located over non-federal coal within the WMA (Table 4.1). In addition, the only historical period Historical Property, 32ME189, would be mitigated through HABS/HAER documentation.

Approximately 5,323 acres and nine Historic Properties overlying federal coal would be directly impacted (Table 4.2). Seven hundred eighty acres in the northwest corner of the WMA and a recorded burial location would be avoided. The 240 acres above federal coal in this area would be stipulated as having no surface disturbance. Within this 780 acres, 12 Historic Properties and 17 other sites would be avoided. Elsewhere in the WMA, 170 other prehistoric sites and 52 historical period sites would be destroyed. Seven hundred eighty acres within the WMA that would be avoided by mining activities and those small areas not necessary for the mine operation would remain undisturbed during the life of the mine. After mining has been completed, land ownership would revert to private (non-corporate) ownership, and access would be by landowner permission. None of the sites would be actively protected from adverse effects.

Alternative B (No Action)

Under Alternative B, the application to lease federal coal would be rejected and federal coal reserves bypassed. Private surface over federal coal would still be affected as non-federal coal is mined (see 2.4). Historic Properties located on private and state coal leases would be mitigated under North Dakota Century Code in concert with the requirements of SMCRA as set forth in North Dakota's coal program. Coteau and the State of North Dakota would determine the management of cultural sites and landscape, Traditional Cultural Properties, and the recorded unmarked burials. BLM would not be involved. For analysis purposes, it is assumed that Historic Properties would be avoided or mitigated by archeological investigations as under Alternative A.

Direct and indirect impacts within the highwall buffer zone (see 2.4) could destroy 102 stone rings, 85 cairns, one stone

Table 4.1
Historic Properties Within the WMA

National Register Site	Minerals	Avoid/ Preserve or Mitigate	Stone Ring	Stone Cairn	Stone Alignments	Stone Lined Depressions	Lithic Scatter and Others
32ME108	FEDERAL	M	5				
32ME1474	PVT	M					1
32ME1475	PVT	M	1	1			
32ME1476	PVT	M	15	7			
32ME1478	PVT	M	4	3			
32ME1482	PVT	M	1				
32ME1483	PVT	M	7				
32ME1488	PVT	M	6				
32ME1491	PVT	M	22	7			
32ME1493	PVT	M	54	3			
32ME1513	FEDERAL	P	100	12	1		
32ME153	FEDERAL	M	83	7			
32ME1539	FEDERAL	A	1	2			
32ME1554	FEDERAL	M	27	1	1		
32ME156	PVT/FEDERAL	M	36	2			
32ME1562	PVT	A	27	4			
32ME1571	PVT	M	7	3			
32ME1577	PVT/FEDERAL	A	28	2			
32ME1578	PVT	P	1	1			
32ME1579	PVT	P	2	1			
32ME1580	PVT	A	1				
32ME1589	FEDERAL	M	1	9	6		
32ME167	PVT	M	11	1			
32ME169	PVT	M	16	1			
32ME171	PVT	M	3	1			
32ME182	FEDERAL	A	14	1			
32ME184	FEDERAL	A	8	2			
32ME185	PVT	P					1
32ME186	PVT	P	4				
32ME187	PVT	M		1			
32ME188	PVT	A					1
32ME206	FEDERAL	M	19	10	1	1	
32ME209	PVT/FEDERAL	M	24	1	1		
32ME232	PVT/STATE	M	27	23			
32ME233	STATE	M	13	6			
32ME238	FEDERAL	M	2	1			
32ME754	PVT	M	37	3			
32ME755	PVT	M	27	2			
32ME757	PVT	M	18	1			
32ME1486	FEDERAL	P					EFFIGY
32ME189	PVT	M					FARMSTEAD
TOTALS	**41**	**41**	**652**	**119**	**10**	**1**	**3**

Table. 4.2 Cultural Resource Adverse Effects by Alternative.			
Adversely Affected	**Proposed Action Alternative A WMA/Fed Coal**	**No Action Alternative B WMA/Fed Coal**	**Preferred Alternative Alternative C WMA/FedCoal**
Acres	16,271/5,323	13,971/2,371	16,191/5,009
Historic Properties	29/9	28/9	28/9
Sites (All)	222/79	199/57+	220/98
Stone Rings	1,157/379	989/187+	1,068/316
Stone Cairns	372/148	365/127+	341/141
Rock Alignments	14/13	5/4+	15/8
Lined Depressions	9/2	9/2+	9/2
Effigies	0/0	0/0	0/0
Burials	0/0	0/0	0/0
Artifact Scatters	5/3	6/0+	5/4

*Estimated adverse effects to cultural resources within 500feet of the federal/private/state interface and known auxiliary facilities such as haul roads may affect additional sites (+).

alignment, and two rock depressions. Historic Properties over federal coal that could be affected or destroyed are 32ME108, 32ME156, 32ME206, 32ME209, 32ME1554, and 32ME1577. This amounts to some 43 percent (6 of 14) of the Historic Properties located above federal coal. Current plans for the initial mining phase show important effects to the cultural landscape and similar impacts to cultural features. The effects are difficult to estimate, but it is known that proposed haul roads could impact two additional Historic Properties, 32ME238 and 32ME1513.

Coteau's current operation plans indicate that some 57 percent (8 of 14) of the Historic Properties located above federal coal are likely to be destroyed under Alternative B. For all cultural resources within the WMA, 46 percent of the stone rings (204 of 444), 59 percent of the stone cairns (98 of 167), 15 percent of the stone alignments (1 of 13), and 100 percent of the stone-lined depressions (2 of 2) located above federal coal could be destroyed by mining activities, even if no federal coal is leased.

For this analysis, it is assumed that the PSC would require avoidance of the same 780 acres within the WMA as under Alternative A. Within this area, 12 Historic Properties and 17 other archeological sites would be avoided. Twenty-three fewer sites, 168 fewer stone rings, seven fewer stone cairns, and nine fewer stone alignments could be affected if federal coal is not leased. While Table 4.3 indicates that 3,980 acres are avoided, major effects could occur on cultural sites from activities associated with mining, overburden stockpiling, haul roads, stock ponds and the like. As in Alternative A, after mining is completed, land ownership would revert to private (non-corporate) ownership, and access would be by permission only. None of the sites would be actively protected from future disturbances.

Alternative C (Preferred)

Federal coal would be leased (5,334 acres) with additional protections for cultural resources above those provided in the Alternative A (Proposed Action). Following the cultural resource Programmatic Agreement and its approved Management Plan for the WMA, 860 acres of the WMA would be declared off-limits to surface disturbance by mining impacts. By agreement with Coteau, who also controls the surface, 240 acres of Federal coal located beneath the W1/2 of Section 4, T. 145 N., R. 88 W., would be removed from the lease application. Within the remaining 5,334 acre lease proposal, BLM would offer for lease and stipulate no surface disturbance on 81 acres within Section 22, T. 145 N., R. 88 W., to protect 32ME1513; similarly, four acres in Section 14 T. 145 N., R. 88 W., would be offered for lease, but with no surface disturbance to protect the Traditional Cultural Property (32ME1486 effigy). Also to avoid additional significant cultural sites within the WMA, there would be no surface disturbance to 535 acres in Section 9, T. 145 N., R. 88 W., and the 240 acres in the W1/2 of Section 4 T. 145 N., R. 88 W., already removed from the lease application. In response to additional finds of unmarked burials within the WMA, the approved Management Plan agrees to move human remains, when necessary, to an acceptable cemetery set aside on one of the preservation areas of the Trust.

This alternative also includes a donation of lands and monies by the lessee to the Indian Cultural Education Trust. The Trust was established for the purpose of generating income to benefit Indian cultural education. By donating lands to the Trust, a segment of the cultural landscape and the archeological sites they contain would be preserved. These sites, which would be transferred from private ownership

into the Trust, would become readily-accessible to American Indians.

Donor agreement(s) would provide for the lessee's donation of approximately 1,240 acres and a substantial monetary amount into the Trust. Eight Historic Properties, 191 stone rings, 80 stone cairns, nine rock alignments, and two stone-lined depressions and the Traditional Cultural Property and 525 acres of cultural landscape would be preserved. Also, seven Historic Properties, 116 stone rings, 35 stone cairns, one rock alignment, and three artifact scatters would be avoided by mining planned within the WMA.

More specifically, donor agreement(s) would provide for a donation to the Trust holding of lands holding two (32ME1486 and 32ME1513) of 14 Historic Properties located above federal coal. In addition, lands holding four of the 27 Historic Properties located above private or state coal within the WMA would be donated to the trust with similar provisions, including 32ME185, 32ME186, 32ME1578, and 32ME1579. Also within donor agreements, portions of two regionally-important Historic Properties, the Boeckel/ Renner Site (32ME799), which contains a burial mound complex and stone features, as well as a portion of the Bee's Nest Site (32ME175), which contains the remains of Raven Chief, an important Mandan leader, would be preserved. The Boeckel/Renner and Bee's Nest sites are located outside the WMA. A total of five additional non-National Register eligible sites would also be preserved.

Alternative C is the only alternative that actively preserves sites through the Indian Cultural Education Trust. Implementation of the Programmatic Agreement and Management Plan for the WMA preserves 283 stone features while continuing to avoid a significant number (152) of the stone features within the WMA. Combined preservation and avoidance of stone features is approximately twice that as under Alternative A which avoids 197 features, and two-thirds more than as avoided under Alternative B (see Table 4.3 for comparison by alternative).

In addition to physical site preservation, Alternative C would protect American Indian heritage for the future and allow free access by American Indian tribes to such lands for traditional and spiritual activities and collection of traditional plants where access may have been previously denied or limited. As important, the lessee would contribute a substantial monetary amount to the Trust for cultural education seed money. The funds would provide tribal peoples the ability to provide cultural education as they see fit.

Residual Effects

All the prehistoric sites in the WMA contain information that could contribute to the interpretation of cultural heritage by archeological investigation. Under present regulations, sites are evaluated for their potential to contain information related to a set of research questions determined to be important at the time of the site evaluation (Peterson 2000). The passage of time, changing perceptions of significance, or new techniques may supersede these research questions. However, the sites would be destroyed before new questions could be investigated. Therefore, there may be inherent value in all the sites, and their destruction could result in residual impacts even if such sites were not currently determined significant (i.e,. National Register Eligible Historic Properties).

Even on sites that are eligible and mitigated through excavation, recovery of all available information is usually not accomplished because sites are rarely completely excavated. No site in the WMA would be systematically excavated in its entirety. Information contained in remaining portions of a site is lost when mining destroys the site.

Coal mining would sever the societal bond with past ancestors and past lifeways by destroying visible cultural features and the natural landscape. In American Indian culture, visible remnants of archeological sites (e.g., stone rings, cairns, alignments, effigies, and burials) and the site's relationship to the natural landscape are sacred (Deaver 2001). This cultural or ethnographic landscape forms a bond between the Indian community and its ancestors. Stones found in circles/cairns/alignments continue to be as ritually and culturally important today as they were in the past. Cultural representatives and tribal elders have repeatedly expressed concerns about how the loss of these cultural resources would affect their communities. Mitigation is not a reality given this belief system. As a result, residual impacts would occur.

None of the 50 historic period sites were determined eligible for listing on the National Register for the archeological information they contain. One site, the Ricker Farmstead, is listed based on its architectural merit. That site would be destroyed after HABS/HAER documentation. Historic features such as this farmstead, windmills, quarry sites and bridge would no longer be visible as mining removes the structures.

The amount of residual impact is reflected in the total number of sites and features overrun by coal mining activities. Acres disturbed by mining are a means to quantify residual impacts. If impacts are mitigated they no longer are considered residual. Long-term preservation of sites and landscapes could be a means to mitigate for cultural resources. Avoidance of sites and landscapes is not the same as long-term preservation since there is no way to assess whether the sites would be adversely affected by future actions. So, within the context of this analysis, the numbers of impacted sites should be balanced with the numbers preserved/mitigated. The number of adversely affected sites, features, and acres is given in Table 4.2 according to alternative.

Table 4.3 Cultural Resource Avoidance Or Preservation By Alternative					
	Proposed Action Alternative A	No Action Alternative B	Preferred Alternative Alternative C		
	WMA	WMA	WMA		OUTSIDE WMA
	Avoided WMA/Fed Coal	Avoided WMA/Fed Coal	Avoided WMA/Fed Coal	Preserved WMA/Fed Coal	Preserved Trust
Acres	780/248	3,980/3200	560/240	300/85*	225**
Historic Properties	12/5	13/5	7/3	6/2	2
Sites (Prehistoric)	29/12	52/34	22/10	7/2	2
Stone Rings	128/65	222/194	116/35	101/93	90
Stone Cairns	33/19	40/40	35/16	13/10	67
Rock Alignments	7/0	16/9	1/0	5/5	4
Lined Depressions	0/0	0/0	0/0	0/0	2
Effigies	1/1	1/1	0/0	1/1	0
Burials	1/1	1/1	0/0	2/2	2
Artifact Scatters	5/1	5/0	3/0	2/2	0

*Does not include lands that will be reclaimed that will also be included in Trust (Total acres is 720).
**Does not include lands that will be reclaimed that will also be included in Trust (Total acres is 520).

Alternative A (Proposed Action)

This alternative has the most residual effect on the landscape, sites and features. All of the landscape, historic properties, sites and features could be adversely affected by mining activities except for the 780 acres in the WMA's northwest corner and around the TCP and unmarked burial that would be avoided by mining operations. This area contains 12 Historic Properties and 17 additional sites. Those sites and lands avoided by mining would remain in private ownership and use.

Alternative B (No Action)

Under this alternative, federal coal is not leased but residual effects may still occur above federal coal tracts because of the highwall buffer zone and related mining activities (see 2.4). The State of North Dakota would require archeological investigations for those sites determined to be Historic Properties. The 780 acres would be avoided as in the Proposed Action. Those features and lands avoided by mining would remain in private ownership and use. Because of the highwall buffer zone, there are only a few sites and features that would not be affected by not leasing federal coal.

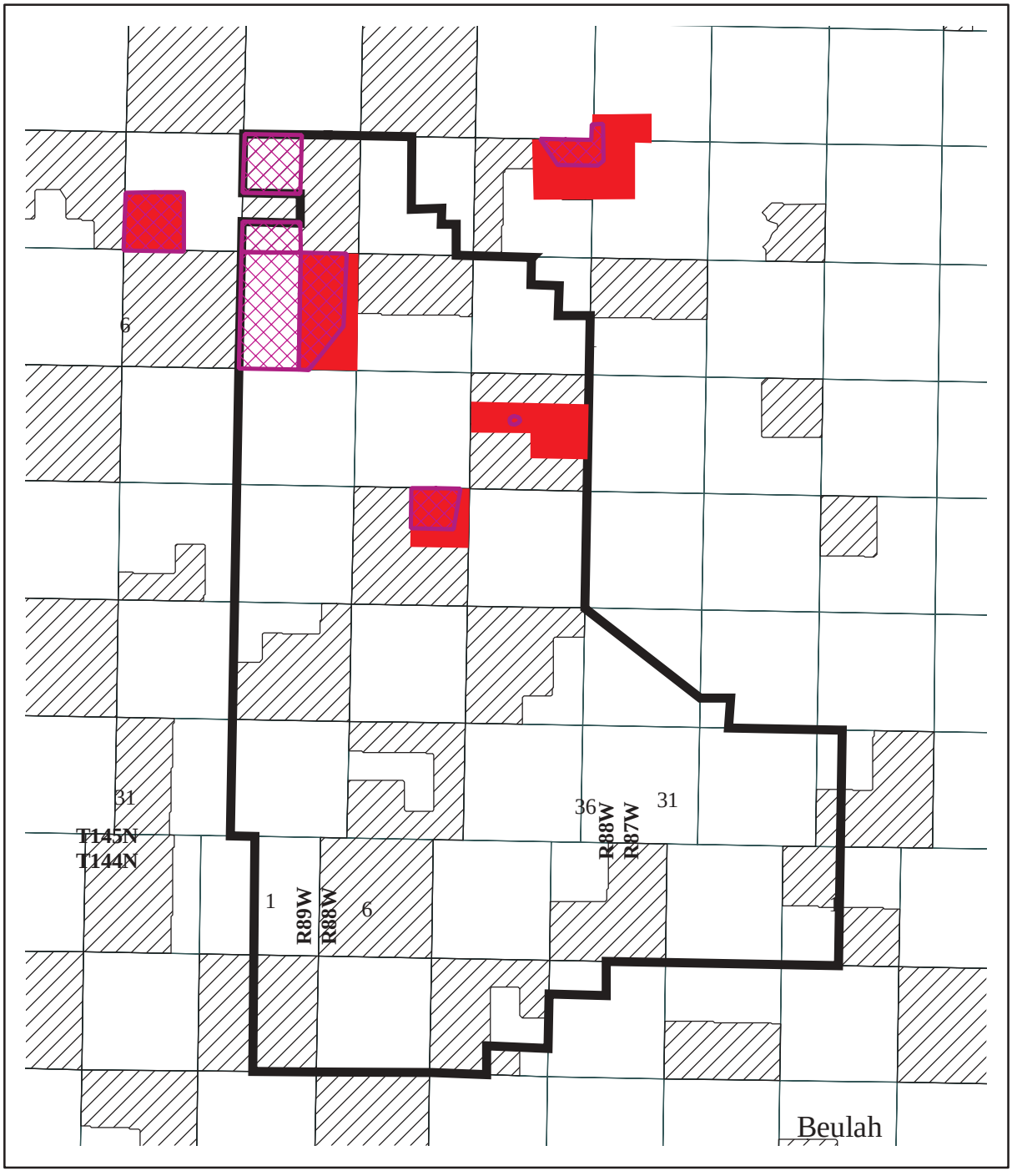
Alternative C (Preferred)

This alternative would have the similar residual effect as the Proposed Alternative except for its additional mitigation measures which preserve the 81 acres on which site 32ME1513 is located. Two hundred fifteen of the 780 acres that are avoided in Alternatives A and B are preserved in the Trust while the other acres remain avoided. With the 215 undisturbed acres within the WMA, an additional 225 acres of the Boeckel/Renner and Bee's Nest sites located outside the WMA would be donated to North Dakota's Indian Cultural Education Trust as mitigation for resource and landscape loss. This is in addition to cultural resource investigations of Historic Properties (Figure 4.1).

Because residual impacts are unavoidable impacts that cannot be mitigated, this alternative provides substantially fewer residual impacts than Alternatives A or B because of mitigation measures. This is supported by Table 4.3, which shows sites avoided or preserved by alternative.

The residual effects of Alternative C are greater than Alternative B but slightly less than Alternative A (Table 4.3). This is accomplished by the addition of sites from within and outside the WMA donated to North Dakota's Indian Cultural Education Trust. Under Alternative C, sites are preserved and accessible rather than being avoided and remaining in private ownership with no control over their disturbance or accessibility. Even with greater adverse effects than Alternative B, Alternative C would have fewer residual impacts on the landscape and archeological remains because of the active preservation of cultural resources. For example, in Alternative A, 128 stone rings are avoided; Alternative B, 222 rings are avoided; however, under Alternative C, 116 rings are avoided, 101 are preserved within the WMA and 90 additional rings outside the WMA are also preserved as

Figure 4.1
Trust Lands and No Surface Disturbance



Legend
- **West Mine Area**
- Federal Coal
- No Surface Disturbance
- Trust Lands

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part of the mitigation plan. So, under Alternative C, 307 rings are part of mitigation, Alternative A only 128, and Alternative B, 222.

In summary, it was found that significant impacts occur to cultural resources under all three alternatives. Through consultation with tribal representatives, it was determined that mining of the coal would have the greatest affect on the Hidatsa, Mandan, Arikara, Sioux, and Assiniboine. These tribes have well-documented historic ties to the area (Boughton 1999; Deaver 2001; Schneider 1994). Because the surface is privately-owned and the federal coal reserves are not contiguous, ancillary activities associated with mining would destroy a significant number of prehistoric American Indian stone features whether federal coal is leased or not. These stone features are significant remnants of the past.

Cumulative Effects

Arguably, there is inherent value in all cultural sites and their destruction would result in cumulative impacts through the loss of the resource from the mining of coal (see Residual Impacts). The loss of a natural landscape and its relationship to the sites is also a substantial and important impact, especially to the American Indians who have been consulted (Deaver 2001). Cumulative impacts are discussed in terms of past effects, effects of the current undertaking, and foreseeable effects of future mining actions of the Freedom Mine on site loss, sites mitigated, and acres disturbed. These categories can be defined in terms of the portions of the cultural landscape that directly relate to the three geographic areas (1) previous mining of the Freedom Mine, (2) WMA, (3) Mine Area 2 North, which Coteau plans on developing in the near future (Figure 4.2). The cumulative impacts for cultural resources are shown in Table 4.4.

Previously-mined areas encompass approximately 27,809 acres. Within these areas, 233 sites have been affected; only sites 32ME175, 32ME158, 32ME1463, and 32ME1528 or parts thereof have been avoided (Friedlander 2003). Nineteen sites have been excavated (Appendix A). In total, approximately 63 rings, 16 cairns, and 800 square meters outside of visible features were systematically excavated. One site was graded by a road patrol to identify and recover archeological features prior to mining. It should be noted that all Historic Properties were subjected to treatment plans complying with Section 106 of the National Historic Preservation Act.

Depending on the alternative, between 13,971 and 16,271 acres would be adversely affected by mining within the WMA (Table 4.2). Between 199 and 222 sites would be destroyed or affected by the mining (depending on alternative). These sites contain some 652 stone rings, 119 cairns, and 14 other visible features. Forty-one sites within the WMA would be avoided, preserved, or mitigated under all alternatives. Under the Alternative C, donor agreements would preserve eight Historic Properties in the Indian Cultural Education Trust, the Traditional Cultural Property would be preserved, and 27 Historical Properties would be investigated.

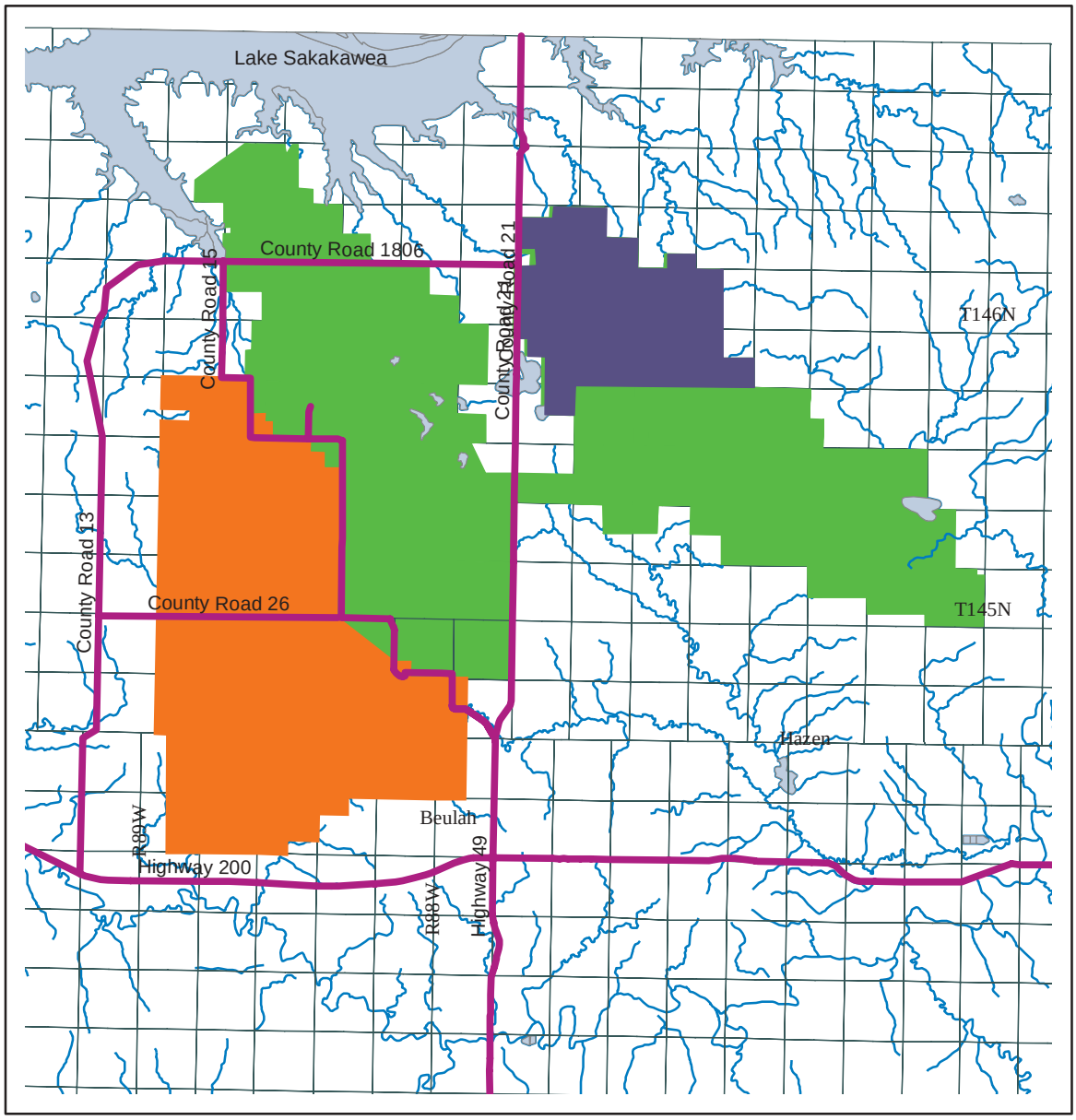
The future mining of Mine Area 2 North would disturb some 5,680 acres and 62 sites. One hundred sixty-two stone rings, 24 cairns, and eight other visible features would be destroyed or affected by the mining. The one site, 32ME254, containing nearly half the visible features has already been investigated under a previous agreement. Recently, nine sites have been mitigated for the Mine Area 2 North, but are not recorded in Appendix A (Friedlander 2004)

From past, current, and for the foreseeable future, mining operations at the Freedom Mine could affect over 50,000 acres. Approximately 546 sites, 367 prehistoric and 179 historic sites, would be destroyed or adversely affected. Visible stone features, including approximately 1,950 stone rings, 541 cairns, and 63 other identified features, will be affected; most will be destroyed.

Table 4.4
Cultural Resource Cumulative Effects

	Previously Mined Areas Areas/Fed Coal	Current WMA WMA/Fed Coal	Future Area 2 N 2 N/Fed Coal	Coteau Mining Region ALL/All Fed Coal
Acres	27,809/7,712	17,051/5,334	5,680/0	50,540/13,046
Total Sites	233/39	251/91	62/0	546/130
Prehistoric Sites	135/24	198/63	34/0	367/87
Historic Sites	98/15	53/28	28/0	179/43
Stone Rings	503/97*	1,285/444	162/0	1,950/541
Stone Cairns	112/30*	405/167	24/0	541/197
Other Features	34/7*	21/12	8/0	63/19
Sites Mitigated	19/3	41/5	9/0	69/8

Figure 4.2
Freedom Mine



Legend

- West Mine Area
- Mine Area 2 North
- Previous Freedom Mine Investigations

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4.9 ENVIRONMENTAL JUSTICE

Impacts Common to All Alternatives

Input from all persons or groups—regardless of age, race, income status, or other social/economic characteristics—was considered. Consultation has been ongoing with representatives of the following tribes: Fort Berthold's Three Affiliated Tribes, Fort Peck's Assiniboine and Sioux, and the Standing Rock Sioux Tribe. Fort Belknap, Oglala Sioux Tribe, Rosebud Sioux Tribe, Santee Sioux Tribe of Nebraska, Yankton Sioux Tribe, Flandreau Santee Sioux Tribe, Turtle Mountain Band of Chippewa Indians, Northern Cheyenne Tribe, Crow Creek Sioux Tribes, and Lower Brule have participated in conversation.

Indian cultural representatives and elders have expressed concerns about the cumulative effects of mining operations on their communities. For most, destruction of any cultural or natural features cannot be mitigated.

Alternative A (Proposed Action)

For American Indians, the societal bond with past ancestors and lifeways would be severed by destruction of visible cultural features and the natural landscape. This is a substantial and important impact, especially to the American Indians who have been consulted (Deaver, 2001). In addition, all prehistoric sites contain information that might contribute to understanding of cultural heritage through archeological investigation. Any information from these sites that is not retrieved under the approved management plan would be lost to future generations. Under this alternative, 5,323 surface acres above federal coal would be disturbed.

Alternative B (No Action)

The impacts would be the same as under Alternative A, except that 2,371 acres would be disturbed.

Alternative C (Preferred)

The impacts would be the same as under AlternativeA , except under this alternative, 5,009 surface acres above federal coal would be disturbed. Additionally, under this alternative, cultural sites would be actively preserved through the Indian Cultural Education Trust (see Chapter 4 Cultural sections).

4.10 SOCIOECONOMICS

Social

Alternative A (Proposed Action)

There would be social impacts to American Indians. These impacts would be greatest under Alternative A and are discussed in the Cultural section of this alternative.

Alternative B (No Action)

The level of mining would stay the same under this alternative. However, local officials are concerned that less money would be available to local governments for road maintenance, schools and other services if the federal coal were not available. Effects to American Indians would be similar as under Alternative A, but less land would be affected (2,373 acres in Alternative B compared to 5,323 acres in Alternative A).

Alternative C (Preferred)

There would be social impacts to American Indians. These impacts are discussed in detail in the Cultural Section (4.8). About 5,009 acres would be affected. But most importantly, under this alternative, sites would be preserved, access would be provided to cultural sites currently held in private ownership, and money would be provided for tribal investment in their cultural and social heritage.

Economics

Coteau would mine the WMA according to approved mining and reclamation plans under all three alternatives. As a result there would be little change in employment; however, the life of mining in the WMA would be determined by the availability of the federal reserves.

Alternative A (Proposed Action)

The leasing of 5,571 acres containing an estimated 93 million tons of federal coal would promote resource conservation by allowing the maximum economic recovery of the federal coal and the intermingled non-federal coal.

According to Coteau's Mine permit application, if the federal coal is leased and a royalty reduction is approved, the amount of federal coal produced in Mercer County could increase from the current average 750 thousand tons, 4.5 percent of the annual total, to approximately 1.6 million tons, 10 percent of the annual total, through 2020 (The Coteau Properties Company, 2002). This amounts to 20 percent of the lease reserves. The remaining 80 percent of the lease reserves would be produced after 2020 through the life of the reserves at levels estimated to range between four and

six million tons per year. There would be a corresponding increase in the federal coal royalty payments. However, there would be no increase in total production or employment as stated in the Mine Permit Application NCMT0201 at Section 3.1.1.2 Federal Coal (The Coteau Properties Company 2002):

> "Mining Federal coal will not result in increased employment, as it is considered a normal part of Coteau's mining operations, not resulting in additional tonnage to be mined. Because no additional production will result from mining Federal coal, there will be no increased demand for public or private entities to provide goods and services to support mining operations."

Alternative B (No Action)

Federal coal would not be offered for lease. However, production would continue in other areas of the mine and the non-federal reserves in the WMA would be mined according to the recently-approved Surface Mining Permit NACT0201 (The Coteau Properties Company 2002). The permit application included the following production schedule for the WMA:

Table 4.5
Section 3.1.1.4 – Coal Production Schedule
(Without Federal Lease)
Note: Subject to change based on customer demands

Year	Total Coal to be Produced	Coal Produced Within Permit (WMA)
2003	15,800,000	0
2004	15,600,000	0
2005	15,600,000	0
2006	15,600,000	0
2007	15,600,000	1,000,000
2008	15,700,000	6,000,000
2009	15,600,000	9,100,000
2010	15,600,000	8,900,000
2011	15,600,000	9,000,000
2012	15,600,000	8,000,000
2013	15,600,000	7,200,000
2014	15,400,000	7,600,000
2015	14,900,000	7,700,000
2016	14,700,000	7,600,000
2017	14,500,000	7,300,000

The mine would continue to supply existing contracts depending on customer requirements. There would be no near-term reduction in production, employment, or severance taxes paid. Long-term, additional reserves would need to be obtained to replace the federal coal that has not been leased in the WMA.

If federal coal is not leased, the loss of the state share of federal royalties would occur and a nonrenewable resource (coal) would not be utilized. Mining in the WMA would be shortened due to loss of the reserves. The cost of mining the non-federal coal in the WMA may increase, and the complete recovery of the non-federal coal may be less likely .

Alternative C (Preferred)

Alternative C would lease 5,334 acres of coal. While approximately 237 acres less would be leased than under Alternative A, only 81 acres less of federal coal would be mined. The other acres were to be avoided because of cultural concerns under both alternatives.

The economic effects spanning the life of the WMA would be negligible. These 81 less acres contain approximately four million tons of the estimated 93 million tons of federal coal within the WMA. Therefore, for this discussion, the impacts would be the same as under Alternative A; mining would proceed according to approved mining and reclamation plans.

4.11 REGULATORY COMPLIANCE, MITIGATION AND MONITORING

All alternatives assume that proper mining and reclamation would be carried out in accordance with existing state and federal regulations. The PSC has primacy over surface mining and reclamation and oversees all aspects of operations. Bonding is required of companies through all phases of mining and reclamation.

Sedimentation ponds and wetlands constructed during reclamation would compensate for mitigation of any wetland habitat removed during mining. North Dakota's law mandating "no net loss" of wetlands and federal Executive Order 11990, dictating wetland protection, require that habitat losses be completely compensated through the reclamation process.

Native prairie and wood/shrub habitat removed by mining would be replaced according to surface owner preference statements. Details on reclamation plans would be worked out between the lessee and PSC in the PAP, with review and approval by appropriate state and federal agencies.

The PSC would handle prime farmlands according to the performance standards found in the Rules Governing the Reclamation of Surface-Mined Land.

4.12 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The major commitment of resources would be the mining and burning of coal for electrical generation and synfuels production. It is estimated that one to two percent of the energy produced would be required to mine the coal. This energy would be irretrievably lost. Mining the coal seam would remove a groundwater aquifer.

Agriculture and wildllife would suffer an irretrievable loss of forage and crop production during mining and early reclamation. The soil profile would be changed on areas disturbed by mining and subsequent reclamation. Soil forming processes, although continuing as soil material is replaced over reshaped overburden, would be irreversibly altered. Replaced soil would be unlike any found in a natural setting.

Mining would disturb the general topography with its pattern of cropland, native prairie, wetlands, and wood/shrub areas. Reclamation would forge a new landscape with its own character.

Any loss of wildlife or human life due to mining and reclamation would be an irretrievable commitment of resources.

For American Indians and local residents, the societal bond with past ancestors and lifeways would be severed by destruction of visible cultural features and the natural landscape. All prehistoric sites within the WMA contain information that might contribute to understanding of cultural heritage through archeological investigation. Any information from these sites that is not retrieved under current mitigation plans would be lost to future generations. Accidental destruction of unknown cultural resources would be irreversible and irretrievable as well.

Alternatives A and C have the nearly the same irreversible and irretrievable commitments of cultural resources on federal tracts. Alternative C sets aside an additional 81 acres of 32ME1513 which saves an additional 108 stone features from being destroyed by mining activities. Alternative C also would mitigate the loss of cultural resources through donation of sites to the Indian Cultural Education Trust. Alternative B has the fewest irreversible and irretrievable commitments of cultural resources, even though substantial impacts would occur above unleased federal coal tracts and the exact number of features affected under Alternative B is difficult to quantify because of incidental impacts.

Mining under Alternative A would disturb 5,323 surface acres above federal coal compared to 2,371 surface acres under Alternative B and 5,009 under Alternative C (Table 4.2). Nine Historic Properties would be destroyed under all alternatives. Seventy-nine cultural sites would be destroyed under Alternative A , while 57 sites would be destroyed under Alternative B, and 98 under Alternative C. Selection of Alternative B would affect approximately half the number of stone rings (187 vs. 379 for Alternative A and 316 for Alternative C) as would Alternatives A or C. Alternative A would affect 148 stone cairns; 127 stone cairns could be affected by Alternative B and 141 for Alternative C. Thirteen stone alignments would be destroyed under alternative A compared to four under Alternative B and eight under Alternative C. Two stone-lined depressions would be destroyed under any alternative. Finally, Alternative A would destroy three cultural material scatters compared to four under Alternative C. No cultural material scatters would be affected under Alternative B.